

Interagency Education Research Initiative -- Revised Version (IERI)

Program Solicitation

NSF 01-92

DIVISION OF RESEARCH, EVALUATION AND COMMUNICATION

LETTER OF INTENT DUE DATE(S) (*required*): April 20, 2001

FULL PROPOSAL DEADLINE(S): June 18, 2001



National Institutes of Health



Department of Education



National Science Foundation



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SUMMARY OF PROGRAM REQUIREMENTS

GENERAL INFORMATION

Program Title: Interagency Education Research Initiative -- Revised Version (IERI)

Synopsis of Program: The goal of the IERI is to improve preK-12 student learning and achievement in reading, mathematics, and science by supporting rigorous, interdisciplinary research on large-scale implementations of promising educational practices and technologies in complex and varied learning environments. To this end, the Initiative will support an evolving, cumulative, and integrated portfolio of research projects that, when taken together, will provide a substantive corpus of effective instructional practices and a body of knowledge that informs the ways in which these practices can be implemented in real, complex, and varied educational environments and lead to enhanced student learning.

An important feature of the Initiative is that all IERI-supported projects will share common benchmarks that will facilitate the accumulation of reliable and valid data to ensure that the lessons learned can be generalized in an optimal fashion. As such, only those projects that meet high standards of methodological rigor, are of sufficient scale, integrate technology, and are conducted by interdisciplinary teams will be funded.

IERI has two focus areas:

1. Early Learning of Foundational Skills
2. Transition to Increasingly Complex Science and Mathematics Learning

Cognizant Program Officer(s):

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- Reid Lyon, Section Chief, National Institute of Child Health and Human Development, 4B05, telephone: 301-496-9849, e-mail: r160a@nih.gov.

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.076 --- Education and Human Resources

ELIGIBILITY INFORMATION

- **Organization Limit:** None
- **PI Eligibility Limit:** None
- **Limit on Number of Proposals:** A principal investigator may submit only one full proposal and he/she may collaborate in one other proposal.

AWARD INFORMATION

- **Anticipated Type of Award:** Standard, Continuing, or Cooperative Agreement
- **Estimated Number of Awards:** Number will depend on mix of full and planning grants awarded
- **Anticipated Funding Amount:** \$48,000,000 pending availability of funds

PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

- **Letters of Intent:** Submission of Letters of Intent is required. Please see the full program announcement/solicitation for further information.
- **Full Proposals:** Standard Preparation Guidelines
 - Standard GPG Guidelines apply.

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required.
- **Indirect Cost (F&A) Limitations:** Not Applicable.
- **Other Budgetary Limitations:** Not Applicable.

C. Deadline/Target Dates

- **Letters of Intent (*required*):** April 20, 2001
- **Preliminary Proposals (*optional*):** None
- **Full Proposal Deadline Date(s):** June 18, 2001

D. FastLane Requirements

- **FastLane Submission:** Required
- **FastLane Contact(s):**
 - DeMonica L. Parks, Research, Evaluation and Communication, 855, telephone: 703-292-5167, e-mail: dparks@nsf.gov.

PROPOSAL REVIEW INFORMATION

- **Merit Review Criteria:** National Science Board approved criteria. Additional merit review considerations apply. Please see the full program announcement/solicitation for further information.

AWARD ADMINISTRATION INFORMATION

- **Award Conditions:** Standard NSF award conditions apply.
- **Reporting Requirements:** Additional reporting requirements apply. Please see the full program announcement/solicitation for further information.

I. INTRODUCTION

The mission to improve education can be supported by vigorous and sustained research and development. State and local policymakers, as well as school-level administrators, need information on how to implement changes - particularly technology-based ones - that lead to increased and sustained student learning. In support of this mission, the Interagency Education Research Initiative (IERI) is meant to help educators meet the challenges of educational improvement by providing scientifically based knowledge and skills that lead to sustainable improvements in education for diverse student populations.

IERI was developed by an interagency team that includes the National Science Foundation (NSF), the Department of Education's Office of Educational Research and Improvement (OERI) and the National Institute of Child Health and Human Development (NICHD). The specific goal of IERI is to improve preK-12 student learning and achievement in reading, mathematics, and science by supporting rigorous, interdisciplinary research on large-scale implementations of promising educational practices and technologies in complex and varied learning environments.

IERI was spurred by the 1997 publication of the President's Committee of Advisors for Science and Technology (PCAST) Report to the President on the Use of Technology to Strengthen K-12 Education in the United States. The report's key recommendation was:

"...that the federal government dramatically increase its investment in research aimed at discovering what actually works, not only with respect to educational technology, but in the field of elementary and secondary education in general. Less than 0.1 percent of our nation's expenditures for elementary and secondary education in 1995 were invested to determine which educational techniques actually work, and to find ways to improve them."

Educational research has provided some important insights into student learning in reading, mathematics, and science, as well as teacher development and teaching strategies and technologies that enhance achievement in these subjects. The research as a whole, however, has lacked a convergent knowledge base that can support systemic reform. The limited use of educational research and development (R&D) for improving practice can be attributed in large part to under-investment in R&D and the consequent fragmentation of the current research effort (see the 1999 National Research Council Report, *How People Learn: Bridging Research and Practice*, <http://www.nap.edu>). It was in recognition of this under-investment, and related lack of knowledge, that IERI was created.

Supporting efforts to develop a knowledge-base for education addresses only part of the problem. When a reasonable knowledge-base does exist - as in the case of literacy development in young children - translating that knowledge into tangible tools and practical procedures for education presents many challenges (see the 1998 National Research Council Report, *Preventing Reading Difficulties in Young Children* and the 1999 National Research Council Report, *Improving Student Learning: A Strategic Plan for Education Research and Its Utilization*,

<http://www.nap.edu>). It is expected that projects funded by IERI will produce knowledge to directly address the challenge of how to bridge the gap between research and practice. To this end, the IERI is most interested in supporting those projects that reflect both scientific integrity and practical utility.

PROGRAM PRIORITIES

IERI supports work that is attentive to the context in which educators do their work, pushing beyond controlled laboratory studies to ensure adaptability to classrooms in complex environments. Research conducted on a scale that allows for a careful examination of how characteristics within a variety of educational systems interact to facilitate learning - under differing conditions and for diverse students - will help accelerate its successful adoption in a wide range of schools. Some research activities will be ready to move to this scale immediately. Others may require a planning grant to set the stage for rigorous research at a larger scale. Both are eligible for IERI support.

An important feature is that all IERI projects will share common characteristics (see section on "Benchmarks") that facilitate the accumulation of reliable and valid data to ensure optimal generalization across diverse educational settings. Therefore, only those projects that meet high standards of methodological rigor, are of sufficient scale, integrate technology, and are conducted by interdisciplinary research teams will be funded.

The emphasis of IERI is on improving educational practices and technologies. However, IERI will support research conducted under controlled laboratory conditions or similarly controlled classroom settings if it meets the following criteria: 1) it is designed within the larger IERI context of studying innovative approaches to teaching reading, mathematics and science; or, 2) it has the potential for providing results that directly inform our understanding of student achievement in these domains under IERI classroom conditions.

Background information on this initiative can be found at the web site:

<http://www.ehr.nsf.gov/ehr/rec/IERI>. Potential applicants are strongly encouraged to review these materials.

II. PROGRAM DESCRIPTION

FOCUS AREAS

Two focus areas supporting the goals of the Initiative have been selected for this Program Solicitation:

- (1) Early Learning of Foundational Skills
- (2) Transition to Increasingly Complex Science and Mathematics Learning

FOCUS AREA I: Early Learning of Foundational Skills

IERI's Focus Area I is concerned with the acquisition of foundational skills in reading, mathematics, and science in pre-K through grade school, assessment of readiness for learning in these domains, research on measures for determining the achievement of proficiency, and investigation of the role of teacher learning and performance on student learning and achievement.

Although the specific areas of emphasis (reading, mathematics and science) are treated separately in the following descriptions, applicants should bear in mind that proposals that integrate these domains are acceptable and encouraged under IERI. The rationale for this integration is that in the early grades, one teacher is frequently responsible for instruction across these three areas for all children in a given classroom. In addition, successful acquisition of foundational mathematical and scientific concepts clearly requires mastery of literacy skills (e.g., reading comprehension). As such, research proposals are invited that illuminate how the integration of instructional strategies in these domains may enhance student achievement.

Reading

One major focus of IERI is to identify and implement in complex and varied educational environments the instructional conditions under which children develop highly-integrated reading skills resulting in optimal reading accuracy, fluency, and comprehension. While more focused, basic research efforts underscore the importance of several factors in learning to read (e.g., phonemic awareness, word level reading skills, automaticity, comprehension strategies, motivation), how best to foster these attributes and abilities in complex instructional settings and with children who vary in cognitive, linguistic, and academic development is not yet fully understood. Consequently, it is anticipated that planning grant and research study proposals submitted in response to this solicitation will contribute knowledge regarding instructional practices and related educational policy issues, as exemplified by the following illustrative questions:

- How can instructional practices in reading found to be effective in smaller, relatively controlled environments be implemented successfully by a wide variety of teachers in complex educational settings?
- What knowledge about reading processes and instructional strategies must teachers possess in order to promote maximum growth in students' reading skills? How does this knowledge translate into greater student learning? How can these practices be scaled beyond individual teachers or small cohorts of teachers?
- For students at-risk for reading failure, which intervention strategies, alone or in combination, provided in which settings (e.g., one-on-one tutorial, small-group, classroom, computer-based, etc.) and which venues (e.g., in-school, after school, weekend, summer, provide optimal sustainable growth in reading skills?

- How can computer and information technologies be used for enhancing the scalability, implementation, evaluation and sustainability of instructional approaches for improving early reading skills in the context of complex educational environments beyond a single classroom, or a small number of classrooms? What new instructional methods or strategies are made possible with computer and information technologies?

Mathematics and Science

It is generally acknowledged that the existing knowledge bases on students' acquisition of mathematical and scientific concepts are neither as complete nor robust as the corpus of findings in the area of reading. This is due at least in part to the comparatively wide range of topics encompassed by mathematics curricula in grades pre-K through 6. Furthermore, there is mounting evidence that teachers themselves frequently lack the thorough understanding of the fundamental concepts in these domains that is clearly necessary to enable them to apply or design effective instructional strategies.

Planning grant and research study proposals within this area of emphasis should contribute knowledge bearing on relevant instructional practices and related policy issues, as expressed by the following illustrative questions:

- What kinds of assessment techniques are needed to determine the mathematic and scientific knowledge and skills that young children bring to school and/or acquire in the early grades? What new assessment techniques are now possible due to computer and information technologies (e.g., using simulations), and how effectively do they measure the development of knowledge and skills in mathematics and science?
- What content and pedagogical knowledge must teachers possess about mathematics and science in order to promote and assess maximum growth in student learning and achievement in these areas? How does this knowledge translate into greater student learning? How can these practices be scaled beyond individual teachers or small cohorts of teachers?
- What instructional practices are most effective for helping children to understand foundational mathematical and scientific concepts?
- How can computer and information technologies be used for enhancing the scalability, implementation, evaluation and sustainability of instructional approaches for improving mathematics and science learning in the context of complex educational environments beyond a single or small number of classrooms? What new instructional methods or strategies are made possible with computer and information technologies?

FOCUS AREA II: Transition to Increasingly Complex Science and Mathematics Learning

Both the Third International Mathematics and Science Study (TIMMS), and the TIMSS-Repeat Study (<http://nces.ed.gov/timss/>) reveal that students in the United States master fundamental skills and knowledge of mathematics and science during their elementary school years at the same rate as their international peers. These studies, however, point out that U.S. students are less likely to master and/or be taught more complex and conceptually difficult material during their middle and high school years, resulting in a downward trend in achievement, relative to students from other countries, as U.S. students move through school. More empirical work is

needed to develop and scale up educational programs and practices that increase students' understanding of complex ideas in mathematics and science as they move through school. This work is especially important, as higher levels of mathematical and scientific knowledge and problem solving skills are required for both higher education and the workplace.

The quality of the teaching force is at the core of any successful effort to improve student learning in science and mathematics. More needs to be known about how to prepare teachers in mathematics and science education, as well as how to support teachers as they develop and hone their knowledge and skills throughout their careers.

Planning grant and research study proposals within this area of emphasis should contribute knowledge bearing on relevant instructional practices and related policy issues, as expressed by the following illustrative questions:

- What are the learning processes by which students move from basic mathematics to more complex mathematics such as algebra and geometry? How do students integrate these learning experiences?
- How can students integrate the learning of mathematics and science in order to use mathematics effectively in various scientific domains?
- How do students learn to integrate the subject matter they learn during their school years? How do they learn to think across different subject areas?
- What are successful ways of promoting skills of scientific inquiry for school-age children?
- What content, student cognitive assessment, and pedagogical knowledge do teachers require in order to be effective? What facilitates conceptual change and greater expertise in teachers' own understanding of mathematical and scientific concepts? What are the learning processes by which teachers become experts in scientific areas?
- How can computer and information technologies be used to enhance students' complex learning? Which approaches promote greater depth of understanding in students? How can these technologies be implemented in complex educational environments beyond a single or small number of classrooms? What new instructional methods or strategies are made possible with computer and information technologies?

BENCHMARKS

Research in education is made especially challenging by the complexities of designing experiments that establish cause and effect relationships between educational inputs and student and teacher outputs; difficulties with implementing random assignment protocols in real world educational settings; the small effect that most isolated controllable variables have on outcomes; the challenges of linking scientific principles grounded in biology, neuroscience, developmental science or cognitive science to educational practice; the high cost of large-scale intervention

studies; and the general inability to extrapolate from small population studies of educational effectiveness to effectiveness for large populations.

IERI encourages proposals that address the above challenges in the context of the two focus areas described above. As such, each research study proposal must satisfactorily address all of the following benchmarks. Proposals that have merit but do not meet these benchmarks may be offered planning grants or recommended for resubmission under other competitions supported by the three partner agencies.

Benchmark I: Research Methodology

IERI proposals must address issues of student learning and achievement by employing research and measurement designs that are demonstrably valid and reliable. Experimental studies, with random assignment, and quasi-experimental designs are encouraged when appropriate. Applicants examining systemic changes where experimental manipulation is difficult, are encouraged to propose inventive solutions, including using research designs and methodologies from other disciplines and areas of research such as public health.

Longitudinal instructional/intervention studies are clearly relevant to describing the amount and rate of student learning over time and in determining the generalization and maintenance of learning over time and across settings. Valid measurement of change over time is critical to much of the research solicited by this Program Solicitation, as the ultimate goal of IERI is to improve student achievement. If instructional or curricular intervention studies are proposed, applicants should employ procedures for separating intervention effects from the effects of development in general. The use of growth curve models and longitudinal data are encouraged, as is the collection of sufficient data prior to, during, and following the intervention study to allow for estimation of change-over-time. For longitudinal studies, the applicant must make clear how attrition within and across different groups will be addressed.

The application of qualitative research methodologies also is encouraged (e.g., interviews with students, teachers, parents and administrators, teacher logs, analysis of teachers' daily plans, videotaping and coding of instructional interactions). Applicants are encouraged to combine quantitative and qualitative methods to optimize the validity and applicability of their findings.

- 1) Research Design: the applicant must provide a detailed research design and include details on how potential threats to internal and external validity will be addressed.
- 2) Sampling: the applicant must define as completely as possible the sample to be selected and sampling procedures to be employed for the proposed study. Additionally, the applicant should show how the participation of those sampled will be assured.
- 3) Data Collection Tools: the applicant must supply information on the reliability, validity, and appropriateness of proposed measures. If the reliability and validity of the measurement, assessment, or observational procedures are initially unknown, the applicant must include specific plans for establishing these measurement properties.

4) Interventions: For educational intervention studies, the applicant must specify how the implementation of the intervention will be documented and measured. The proposal should either indicate how the intervention will be maintained consistently across multiple classrooms, schools, sites over time or describe the parameters under which variations in the intervention may be described.

5) Data Analysis: All proposals should provide detailed descriptions of data analysis procedures. For quantitative data, specific statistical procedures should be cited. For qualitative data, specific methods used to index, summarize, and interpret text should be delineated.

Benchmark II: Scalability

In the context of this IERI solicitation, scalability refers to the development of productive linkages between research knowledge (either basic or applied) and educational practice embedded in the multilevel organizational structure of schools and the process of schooling. It is expected that IERI projects will investigate a range of factors related to scalability including, but not limited to:

- 1) Implications for the professional development of teachers
- 2) Influences on administrative structures and organizational cultures of schools studied
- 3) Strategies for the coordination of constituencies (e.g., teachers, administrators, students, parents, community groups) interested in the improvement of education
- 4) Consequences of economic/resource demands associated with proposed educational innovation
- 5) Recognition of knowledge communities (e.g., teaching, research, administration) who will utilize research findings

Proposals should summarize both the current knowledge base and problems with implementing this knowledge in school settings. Proposals must include explicit justifications for their scaling-up plans, outlining how this line of research will advance efforts to translate knowledge into practice. Empirical evidence regarding the effectiveness of an innovative curriculum or technology means little if the curriculum cannot be implemented and sustained in diverse classroom environments. At every level of scalability researchers need to study and document issues regarding training, implementation, and fidelity. Additionally, this research needs to examine how effective educational innovations can be sustained and/or evolve over time.

Benchmark III: Technology

Technology encompasses a variety of electronic tools, media, and environments that can be used to enhance student learning, foster creativity, stimulate communication and collaboration among teachers and students, and engage in the continuous development and application of knowledge and skills. Technology may be proposed as a tool, device or environment for implementing and/or evaluating specific learning/instructional approaches and strategies. It may be used for

enhancing the effects and efficiency of already proven methods or strategies in traditional settings or to develop new educational methods or strategies. Technology also may be used as a management tool in implementing proposed studies. Proposals that concentrate solely on using technology without addressing educational issues and questions relevant to the basic requirements of this Initiative will not be funded.

Benchmark IV: Interdisciplinary Research Teams

Due to the complexity of the subject matter and the environments in which educational research and practice take place, interdisciplinary research teams will be necessary to bring a wide variety of knowledge and methodologies to bear on the problems associated with conducting and integrating research in educational settings. Collaborations across disciplines (e.g., information technologists, organizational scientists, economists, psychometricians, mathematicians, statisticians, educational researchers, cognitive scientists, developmental psychologists, disciplinary scientists, and practitioners) are required. Qualitative and quantitative researchers from various fields are expected to enrich both the research designs and the methodologies proposed for applications under this Initiative. Applicants must ensure, in meaningful ways, continual input and interaction with those disciplines that are relevant not only to the immediate program of work but also to its eventual application. Of particular importance to the review process will be the linkage to policy and practice from the earliest stages of the project.

Because IERI is a long-term initiative oriented toward specific educational issues, the coordination of research projects is particularly important. Principal Investigators will be required to meet at least twice each year with agency staff and consultants to review results within their areas, discuss methodologies, and identify promising avenues for future research efforts. Where interventions are studied, investigators will be asked to develop and use a core of common methodologies, instruments, and data analysis procedures to facilitate the synthesis of research findings across projects.

III. ELIGIBILITY INFORMATION

The categories of proposers identified in the [Grant Proposal Guide](#) are eligible to submit proposals under this program announcement/solicitation.

IV. AWARD INFORMATION

Under this Program Solicitation, the three partner agencies solicit proposals for planning grants and research study grants. Funding for planning grants will be for a maximum of \$100,000 for up to 12 months; funding for research study grants will typically be for up to \$6 million for the life of the award (up to 60 months). Proposals submitted for research study grants that do not meet one or more of the benchmarks but are judged to have merit may be offered a planning grant so that further development work can be conducted prior to re-submission. Pending the availability of funds for FY 2001, the total funds available under this Initiative - to fund successful proposals across two competition cycles (one under 00-74 and the other under this solicitation) - will be up to \$48 million: \$25 million from NSF, \$20 million from OERI, and \$3 million from NICHD. Awards will be made through the NSF. Grantees must be willing to accept the award conditions. In particular, the human subjects certifications must conform to the NSF's requirements.

Planning grants must contain a clear rationale for the proposed work as a necessary step toward the submission of a research study proposal or the advancement of knowledge in a chosen field. Planning grants will be funded for a variety of activities, including, but not limited to one or more of the following:

- development of plans for a data collection center (DCC) that would coordinate measurement instruments, facilitate research design planning and problem-solving, and coordinate the analysis of data from multiple projects within a designated subject area, and provide assistance in dissemination and utilization of research project results.
- the collection of pilot/preliminary data to: (a) assess the feasibility of sampling strategies to ensure that sufficient sample sizes and sample characteristics can be ascertained; (b) establish the necessary reliability and validity estimates for psychometric measures, observational protocols, interview schedules, and other measurement strategies; and/or, (c) assess the appropriateness of experimental design models and/or data analysis strategies.

Research study grants will be made for projects that address one of the focus areas and meet all the benchmarks outlined in section III of this Program Solicitation.

Additionally, PIs may submit collaborative proposals (see the NSF Grant Proposal Guide, NSF 01-2 Chapter II Section C.3 Group Proposals, and Chapter II Section C.11.b Collaborative Proposals) for research involving collaborations between institutions. Standard, continuing, and cooperative agreement grant award mechanisms may be utilized under this Program Solicitation.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent: Prospective applicants are required to submit a Letter of Intent (LOI). The LOI should be submitted by e-mail by April 20, 2001 to ieri@nsf.gov. The letter must be three to five pages in length and must identify the PI and known Co-PI's, the institutional affiliations of the PI and the Co-PI's, expected budget request, and a description of how the proposed project addresses one or both focus areas and all four benchmarks this Program Announcement outlines. Program staff from the three agencies will review the Letters of Intent. Although LOIs are required, they are not binding, and will not be used in proposal evaluation. Information contained in the Letters will allow staff from the three agencies to provide preliminary feedback regarding the appropriateness of the proposed research for the IERI, to estimate the potential review workload, and to avoid conflict of interest in the review process. The Letters of Intent will be acknowledged by email from federal project officers from the three participating agencies. Review of the LOIs and communication back to the applicant may take as long as three weeks.

Proposers are reminded to identify the program solicitation number (NSF-01-92) in the program solicitation/solicitation block on the proposal Cover Sheet (NSF Form 1207). Compliance with this requirement is critical to determining the relevant proposal processing guidelines.

Full Proposal:

Proposals submitted in response to this program announcement/solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF *Grant Proposal Guide* (GPG). The complete text of the GPG is available electronically on the NSF Web Site at: <http://www.nsf.gov/cgi-bin/getpub?nsf012>. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

Proposers are reminded to identify the program solicitation number (NSF 01-92) in the program announcement/solicitation block on the NSF Form 1207, *Cover Sheet For Proposal to the National Science Foundation*. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Budgetary Information

Cost sharing is not required in proposals submitted under this Program Solicitation.

C. Deadline/Target Dates

Proposals must be submitted by the following date(s):

Letters of Intent (*required*): April 20, 2001

Full Proposals by 5:00 PM local time: June 18, 2001

Letters of intent and proposals should be sent electronically

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this Program Solicitation through the FastLane system. Detailed instructions for proposal preparation and submission via FastLane are available at: <http://www.fastlane.nsf.gov/a1/newstan.htm>. For FastLane user support, call 1-800-673-6188.

Submission of Signed Cover Sheets. The signed copy of the proposal Cover Sheet (NSF Form 1207) must be postmarked (or contain a legible proof of mailing date assigned by the carrier) within five working days following proposal submission and be forwarded to the following address:

National Science Foundation
DIS – FastLane Cover Sheet
4201 Wilson Blvd.
Arlington, VA 22230

VI. PROPOSAL REVIEW INFORMATION

A. NSF Proposal Review Process

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-serving institutions, or adjacent disciplines to that principally addressed in the proposal.

Proposals will be reviewed against the following general review criteria established by the National Science Board. Following each criterion are potential considerations that the reviewer may employ in the evaluation. These are suggestions and not all will apply to any given proposal. Each reviewer will be asked to address only those that are relevant to the proposal and for which he/she is qualified to make judgements.

What is the intellectual merit of the proposed activity?

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

What are the broader impacts of the proposed activity?

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

Principal Investigators should address the following elements in their proposal to provide reviewers with the information necessary to respond fully to both of the above-described NSF merit review criteria. NSF staff will give these elements careful consideration in making funding decisions.

Integration of Research and Education

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals

may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

Integrating Diversity into NSF Programs, Projects, and Activities

Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

Additional Review Criteria

IERI is intended to foster synergistic research that addresses the goal of developing an empirical knowledge base for enhancing student achievement through improved educational practices. Towards that end, priority will be given to IERI applications that:

- Meaningfully address one of the two focus areas.
- Propose a research methodology that satisfies the criteria for rigor outlined in benchmark I.
- Propose a project of sufficient scale to meet the criteria for scalability outlined in benchmark 2. Applicants must demonstrate that the academic partnerships and partnerships with participating school systems are sufficiently developed to carry out the proposed research activities.
- Propose a usage or usages of educational technology that satisfies the criteria outlined in benchmark III.
- Propose an interdisciplinary research team that meets the criteria outlined in benchmark IV. Applicants must provide sufficient evidence that the individuals proposed are qualified for their specified roles.

A summary rating and accompanying narrative will be completed and signed by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

B. Review Protocol and Associated Customer Service Standard

All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. Proposals submitted in response to this announcement/solicitation will be reviewed by Mail and/or panel review.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

In most cases, proposers will be contacted by the Program Officer after his or her recommendation to award or decline funding has been approved by the Division Director. This informal notification is not a guarantee of an eventual award.

NSF will be able to tell applicants whether their proposals have been declined or recommended for funding within six months for 95 percent of proposals. The time interval begins on the proposal deadline or target date or from the date of receipt, if deadlines or target dates are not used by the program. The interval ends when the Division Director accepts the Program Officer's recommendation.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at its own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program Division administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See section VI.A. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (NSF-GC-1)* or Federal Demonstration Partnership (FDP) Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

*These documents may be accessed electronically on NSF's Web site at http://www.nsf.gov/home/grants/grants_gac.htm. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions is contained in the *NSF Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Web site at <http://www.nsf.gov/cgi-bin/getpub?gpm>. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is (202) 512-1800. The GPM may be ordered through the GPO Web site at <http://www.gpo.gov>.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Grantees will be required to participate in bi-annual PI meetings. Proposal budgets should reflect travel costs for two or three participants to travel to Washington, DC for two meetings a year.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Approximately 30 days before expiration, NSF will send a notice to remind the PI of the requirement to file the final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

NSF has implemented an electronic project reporting system, available through FastLane. This system permits electronic submission and updating of project reports, including information on project participants (individual and organizational), activities and findings, publications, and other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system.

VIII. CONTACTS FOR ADDITIONAL INFORMATION

General inquiries regarding Interagency Education Research Initiative -- Revised Version should be made to:

National Science Foundation Contacts

- Finbarr (Barry) Sloane, Program Manager IERI, Research, Evaluation, and Communication, 855, telephone: 703-292-5146, e-mail: fsloane@nsf.gov.
- John Cherniavsky, Senior Advisor for Research, Research, Evaluation, and Communication, 855, telephone: 703-292-8650, e-mail: jchernia@nsf.gov.
- Janice Earle, Program Director, Elementary, Secondary, and Informal Education, 885, telephone: 703-292-8628, e-mail: jearle@nsf.gov.
- Rodney Cocking, Program Director, Behavioral and Cognitive Sciences, 995, telephone: 703-292-8732, e-mail: rcocking@nsf.gov.

- Steve Breckler, Program Director, Behavioral and Cognitive Sciences, 995, telephone: 703-292-8728, e-mail: sbreckle@nsf.gov.
- Paul Werbos, Program Director, Electrical and Communications Systems, 668, telephone: 703-292-8339, e-mail: pwerbos@nsf.gov.
- Anthony Maddox, Program Director, Experimental and Integrative Activities, 1160, telephone: 703 292-8980, e-mail: amaddox@nsf.gov.
- Henry Blount, Head, Office of Multidisciplinary Activities, 1005, telephone: 703-292-8803, e-mail: hblount@nsf.gov.
- Kimberly Sullivan, Program Director, Integrative Biology and Neuroscience, 685, telephone: 703-292-8421, e-mail: Kasulliv@nsf.gov.

Department of Education Contact

- Harold Himmelfarb, Director, Office of Educational Research and Improvement, National Institute on Student Achievement, Curriculum and Assessment, telephone: 202-219-2031, e-mail: Harold_himmelfarb@ed.gov.

National Institutes of Health Contact

- Reid Lyon, Section Chief, National Institute of Child Health and Human Development, 4B05, telephone: 301-496-9849, e-mail: r160a@nih.gov.

For questions related to the use of FastLane, contact:

- DeMonica L. Parks, Research, Evaluation and Communication, 855, telephone: 703-292-5167, e-mail: dparks@nsf.gov.

IX. OTHER PROGRAMS OF INTEREST

The NSF *Guide to Programs* is a compilation of funding for research and education in science, mathematics, and engineering. The NSF *Guide to Programs* is available electronically at <http://www.nsf.gov/cgi-bin/getpub?gp>. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer announcements or solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF [E-Bulletin](#), which is updated daily on the NSF web site at <http://www.nsf.gov/home/ebulletin>, and in individual program announcements/solicitations. Subscribers can also sign up for NSF's [Custom News Service](#) (<http://www.nsf.gov/home/cns/start.htm>) to be notified of new funding opportunities that become available.

The following programs may be of interest to potential IERI proposers. Information on NSF guidelines can be obtained from <http://www.nsf.gov>.

- Elementary, Secondary, and Informal Education (ESIE), NSF 01-060
- Centers for Learning and Teaching (CLT), NSF 00-148.
- National SMETE Digital Library Program, NSF 00-042.
- Research on Learning and Education (ROLE), NSF 00-017.
- Information Technology Research, NSF 99-167.
- Child Learning and Development Program, NSF 99-042

Department of Education programs particularly

- Field-Initiated Studies (FIS) Education Research Grant Program, Department of Education, <http://www.ed.gov/offices/OERI/funding.html>.

National Institutes of Health programs at NICHD

National Institutes of Health Extramural Funding, <http://www.nichd.nih.gov/funding/funding-ops.htm>.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF (unless otherwise specified in the eligibility requirements for a particular program).

Facilitation Awards for Scientists and Engineers with Disabilities (FASSED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the program announcement/solicitation for further information.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090, FIRS at 1-800-877-8339.

The National Science Foundation is committed to making all of the information we publish easy to understand. If you have a suggestion about how to improve the clarity of this document or other NSF-published materials, please contact us at plainlanguage@nsf.gov.

ABOUT THE DEPARTMENT OF EDUCATION

The U.S. Department of Education's mission is to:

- Strengthen the Federal commitment to assuring access to equal educational opportunity for every individual;
- Supplement and complement the efforts of states, the local school systems and other instrumentalities of the states, the private sector, public and private nonprofit educational research institutions, community-based organizations, parents, and students to improve the quality of education;
- Encourage the increased involvement in the quality and usefulness of education through Federally supported research, evaluation, and sharing of information;
- Improve the coordination of Federal education programs;
- Improve the management of Federal education activities; and
- Increase the accountability of Federal education programs to the President, the Congress, and the public.

Additional information can be found on the Department web site: <http://www.ed.gov>

Within the Department of Education, the Office of Educational Research and Improvement (OERI) provides national leadership for educational research and statistics. OERI strives to promote excellence and equity in American education by:

- Conducting research and demonstration projects funded through grants to help improve education;
- Collecting statistics on the status and progress of schools and education throughout the nation; and
- Distributing information and providing technical assistance to those working to improve education.

Additional information can be found on OERI's web site: <http://www.ed.gov/offices/OERI/>

ABOUT THE NATIONAL INSTITUTE OF CHILD HEALTH AND HUMAN DEVELOPMENT

The National Institute of Child Health and Human Development (NICHD) seeks to assure that every individual is born healthy, is born wanted, and has the opportunity to fulfill his or her potential for a healthy and productive life unhampered by disease or disability. In pursuit of this mission, the NICHD conducts and supports laboratory, clinical, and epidemiological research on the reproductive, neurobiologic, developmental, and behavioral processes that determine and maintain the health of children, adults, families, and populations.

The NICHD Administers a multidisciplinary program of research, research training, and public information, nationally and within its own facilities, on reproductive biology and population issues; on prenatal development as well as maternal, child and family health; and on medical rehabilitation. Institute Programs are based on the concepts that adult health and well-being are determined in large part by episodes early in life, that human development is continuous throughout life, and that the reproductive processes and the management of fertility are of major concern, not only to the individual, but to society.

NICHD research is also directed toward restoring or maximizing individual potential and functional capacity when disease, injury, or a chronic disorder intervenes in the developmental process.

The Institute supports and conducts basic, clinical, and epidemiological research in the reproductive sciences to develop knowledge enabling men and women to regulate their fertility in ways that are safe, effective and acceptable to various population groups, and to overcome problems of infertility.

The purposes of Institute sponsored behavioral and social sciences research in the population field are to understand the causes and consequences of reproductive behavior and population change. Research for mothers, children, and families is designed to advance knowledge of pregnancy, fetal development, and birth; to develop strategies to prevent infant and child mortality; to identify and promote the prerequisites of optimal physical, mental, and behavioral growth and development through infancy, childhood, and adolescence; and to contribute to the prevention and amelioration of mental retardation and developmental disabilities. Much of this research focuses on the disciplines of cellular, molecular, and developmental biology to elucidate the mechanisms and interactions that guide a single fertilized egg cell through its development into a multicellular, highly organized adult organism. Research in medical rehabilitation is designed to develop improved techniques and technologies with respect to the rehabilitation of individuals with physical disabilities resulting from diseases, disorders, injuries, or birth defects.

Research training is an area supported across all NICHD research programs, with the intent of adding to the cadre of trained professionals available to conduct research in areas of critical public health concern. An overarching responsibility of the NICHD is to disseminate information emanating from the Institute research programs to researchers, practitioners and other health professionals, and to the general public.

Additional information can be obtained at <http://www.nichd.nih.gov/>.

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to applicant institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

Pursuant to 5 CFR 1320.5(b), an agency may not conduct or sponsor, and a person is not required to respond to an information collection unless it displays a valid OMB control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne Plimpton, Reports Clearance Officer, Information Dissemination Branch, Division of Administrative Services, National Science Foundation, Arlington, VA 22230, or to Office of Information and Regulatory Affairs of OMB, Attention: Desk Officer for National Science Foundation (3145-0058), 725 17th Street, N.W. Room 10235, Washington, D.C. 20503.

OMB control number: 3145-0058.